Curriculum Vitae

Name: **Supriya Jain**

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Employment: **Research Scientist, 12/2009 - present**
Physics Department, SUNY at Buffalo, NY
"CMS" experiment, CERN, Switzerland
[Full-time at Fermi National Accelerator Laboratory (Fermilab)
Batavia, IL 60510]

Research Associate, 9/2003 - 11/2009
Physics Department, Univ of Oklahoma, OK
[Full-time at Fermilab, "D0" experiment]

Education

Ph.D (Physics), 2003: Tata Institute of Fundamental Research (TIFR), Mumbai, India
(in collaboration with D0 experiment at Fermilab)
Master of Science (MS), Physics, 1997: University of Delhi, India (**Gold medallist**)
Bachelor of Science (BS), Physics Honors, 1995: University of Delhi, India

Leadership Roles

- Leader of Discussion Session on *Statistics for Particle Physics* at the Vth CERN-Fermilab Hadron Collider Physics Summer School (2010)
- Leader of Data-Quality Group at D0 experiment (2006 – 2009)
- Coordinator of Top-Quarks-To-Charged-Higgs analyses at D0 (2006 - 2009)
- Coordinator of Fermilab Women Scientists' and Engineers Group (2004 - 2009)
- Coordinator of Asian-Indian Group at Fermilab: "Drishti" (2005 – present)

Research Accomplishments

- Discovering rare single-top quark production (2003 – 2009)
- Searching for new physics beyond the Standard Model of Particle Physics (1998 - present)
- Developing state-of-the-art techniques in Bayesian Statistics for data analysis, (2003 – present);
  independently, as well as in "ROOSTATS", which is a collaborative project between the ATLAS and CMS experiments at CERN, Switzerland, and the ROOT team, to provide a complete statistical suite in ROOT. (ROOT is an object-oriented framework for large-scale data analysis).

Academic Honors

- Member of the **International Advisory Committee** by invitation, for the First International Workshop on LHC Era Physics (**LHEP**) in 2010, Nanning, China.

- Nominated to full membership of **Sigma Pi Sigma** National Physics Honor Society (2010).
- **Certificate of Achievement** for "Captain Dedicated Shifter" at D0, 2009.
- **Gold medal**, 1997: University of Delhi for first rank in MS out of a class of 175 students.
- **Certificate of Merit, 1992**: All India Senior Secondary Certificate Examination, Standard XII, for being among the **top 0.1%** of successful candidates in India; Gold medal in school for first rank in city.
- **Gandhi Centenary Scholarship, 1990-1995:** awarded by the Steel Authority of India Limited (SAIL). This scholarship is in recognition of excellent academic record in school, awarded at a national level to the children of SAIL employees.

Computing Skills

- Programming languages: C++ (Object-Oriented), FORTRAN, PYTHON; Extensive experience in software development for specific physics analyses as well as for use by the entire D0 and CMS experiments (1998 – present).
  Also contributed code to the public **Physics Statistics Code Repository** (*www.phystat.org*) on "Reference Priors" in Bayesian Statistics for High Energy Physics.
- Monte Carlo event generators: PYTHIA, CompHEP.
- Monte Carlo simulators of interactions with matter: GEANT4.
- Web Designing: HTML, Kompozer.
- Web documentation of code: DOXYGEN.
- Operating systems: MAC, LINUX, UNIX, WINDOWS.
- Particle-physics data analysis packages: PAW, ROOT, TMVA (Toolkit for MultiVariate Analysis).
- LINUX-system administrator at Fermilab for the University of Oklahoma (2003-2009);
  MAC-system administrator at Fermilab for SUNY, Buffalo.

Other Skills

- Hands-on experience in Electronics: During MS, Electronics was my "specialization" subject. Along with the theory of analog and digital electronics, we had one full year of laboratory sessions (every day, afternoon) for designing electronic circuits.
- Also conversant with Silicon Detector Technology.

Other Responsibilities

- Reviewing physics analyses at D0.
- Mentoring graduate and summer students.
- D0 control-room shifts:
  - CAPTAIN shifts, Data AcQuisition (DAQ) shifts, Silicon-detector shifts.
- CMS shifts on Data Quality Certification.
  I was fortunate to be on shift on 30 March 2010 and certify the first few runs from LHC's 7 TeV collisions. Here is a clip in The New York Times of the LHC start-up (you may

see me in the bottom-left side in the video screen-capture of remote shifters):
http://www-d0.fnal.gov/~sjain/mypage/NYTimesLHC_30Mar2010.pdf

- D0 natural-emergency warden (2006 – 2009).

Publications/Presentations

- Co-authored over 200 publications in leading journals, with >10 on analyses where I played a central role (2000 – present).
- Co-authored over 30 Internal Notes for the D0 and CMS Collaborations (2000 - present)
- Presented talks at several international conferences.

Details of all above are provided in subsequent pages.

Research Accomplishments

Discovery of Rare Single Top Quark Production (2003 – present)

On 4 March, 2009, D0 reported a first observation of the electroweak production of single top quarks, at a statistical significance of 5 standard deviations:
Fermilab Press Release:
http://www.fnal.gov/pub/presspass/press_releases/Single-Top-Quark-March2009.html

I played a central role in this search, and am one of the principal authors for >5 publications on this topic in leading journals (***cited over 100 times***). The top quarks were first discovered at Fermilab in 1995, but in pair-production mode: top-antitop pairs. But the so-far successful theory of Particle Physics: the Standard Model, also predicts the production of single top quarks (top or antitop). The search for single top quarks was on since then, but so far this mode remained elusive because of the enormous challenge associated with it. Its production rate is comparable to that for top-antitop pair-production, but the backgrounds and their uncertainties are much larger. Advanced analysis techniques were employed to identify the putative single-top signal. Three competing multivariate techniques were applied: Bayesian neural networks (BNN), Boosted Decision trees (DT), and Matrix elements (ME) all of which had common pre-selections but different sensitivities.

I led the team performing the BNN analysis (first application in high energy physics) which yielded the best expected sensitivity in the "evidence" analysis (significance of 3 standard deviations, *Phys. Rev. D 78: 012005, 2008*). I also performed a combination of all three analyses to further improve the sensitivity (*Phys. Rev. Lett. 103: 092001, 2009*). I also developed the Bayesian statistical analysis tool for measuring cross sections and their significance, and the framework for generating ensembles of pseudo-datasets for testing the statistical machinery and estimating the significance of measurements. The observation of single top quarks is one of the major achievements in the field of particle physics. Besides its physics implications and confirmation of yet another prediction of the SM, it serves as a test-bed for searches for small signals with huge backgrounds, like that for the Higgs boson and several processes beyond-SM.

Here is an article I wrote on the first observation of single top quarks for a local section of the Chicago Tribune:
http://www.triblocal.com/Wheaton/List_View/view.htmltype=stories&action=detail&sub_id=55662

Searches for Physics Beyond the Standard Model (SM)

Besides the search for single top quarks under the SM theory, I explored several possibilities of new (non-SM) physics phenomena, some of which are the following:

- ***Search for Flavor-Changing-Neutral-Currents in Single Top Production***

(published in *Physical Review Letters 99: 191802, 2007, cited 23 times.)*
Since the top quark is unusually heavy, any anomalous coupling might be observed in the top-quark sector. I explored possible FCNC interactions between the top quark and an up (u) or a charm (c) quark through the emission of a gluon. Strong constraints from the CDF collaboration at the Tevatron collider, and the L3 and ZEUS collaborations at the LEP and HERA colliders, respectively existed for FCNC processes via photon or Z boson exchange, but the search for FCNC couplings of a gluon (g) to the top quark was the first analysis of this kind at hadron colliders. There were two parameters in the analysis, κ_g^c/Λ and κ_g^u/Λ, where κ_g defines the strength of the coupling between the top quark and the u or c quark, and Λ defines the scale of new physics. I developed a strategy to perform a simultaneous fit to data in a two-dimensional plane of these parameters, and extracted the best possible limits on them.

- ***Search for Charged Higgs Bosons ($H^{\pm}$) in Decays of Top Quarks***
  (published in *Physical Review D80: 051107 (R), 2009, cited 4 times.)*
  In the Standard Model, the top quark is predicted to decay almost always to a W boson and a "b" quark. But some extensions of the SM (e.g., two-Higgs doublet models) allow the decay $t \rightarrow H^+ b$. We probed the $H^{\pm}$ mass range of 80-155 GeV, for $m(H^{\pm}) < m(\text{top})$, and considered a search optimized for SM decays of the top-antitop system to lepton+jets final states. If the $H^{\pm}$ exists, this would lead to a deficit of events relative to the SM prediction owing to differences in decay branching fractions and kinematic distributions. In the absence of such deficit, we set the world's best limits on the branching fraction of top quarks to charged Higgs for different values of $m(H^{\pm})$.

- ***Search for top-antitop Resonances***
  (published in *Physical Review Letters 92: 221801, 2004, cited 24 times.)*
  This was the basis of my Ph-D dissertation in 2003. I performed a search for narrow-width heavy resonances, Z', decaying to top-antitop pairs. These are allowed in certain extensions of the SM, for example, in topcolor-assisted-technicolor models. I set the world's best limits on $M(Z')$ at the time. I am currently performing this analysis using the data from the CMS detector at the Large Hadron Collider (LHC) at CERN, Switzerland.

- ***Search for Quark-Lepton Compositeness:***
  (published in *Phys. Rev. D62:095003, 2000, cited 3 times.)*
  According to the Standard Model, quarks and leptons are fundamental point-like particles that cannot be divided further into smaller objects. But some new theories predict a structure within them. I explored this further using Monte Carlo simulations during my initial years of learning the techniques of data analysis in high-energy physics.

Developing new techniques in Bayesian Statistics (2003 – present)

I played a leading role in developing at D0 both the conceptual and technical framework for advanced statistical analysis using Bayesian techniques. This included the use of differences in "shapes" of signal and background characteristics rather than simple "event-counting" as well as sophisticated treatment of uncertainties in measurements in order to enhance the sensitivity of an analysis. I am currently exploring further the formulation of "priors" in this approach. The convention thus far has been to use a uniform (flat) prior for the quantity being measured, which in our field, is usually the production rate for the signal being searched for. This choice is made principally because it is simple to implement and yields results that are broadly accepted as reasonable. However, there is no guarantee that the results obtained using a flat prior for the signal are, in some well-defined sense, the best nor that they enjoy properties that would be regarded as desirable. A large body of literature exists describing priors that yield results with provably useful characteristics. These are called "Reference Priors". I am currently working on this, and my work so far is summarized in ***Phys. Rev. D82:034002.*** My initial code for generating reference priors is uploaded to the public Physics Statistics Repository: www.phystat.org.

Reviewing Physics Analyses

Typically a physics analysis at D0 is done by a small group of individuals. After such a group has started its work, the experiment forms a so-called Editorial Board (EB), typically consisting of 5 scientists, who are not part of the group analyzing the data. The task of this EB is to review the analysis performed and determine the public dissemination of its results. I have served as an EB member for a number of physics analyses at D0.

Leading the D0 Data Quality Group (2007 - 2009)

The D0 experiment at the Fermi National Accelerator Laboratory (Fermilab), is a collaborative effort of 650 physicists from 90 institutions in 18 countries. It is a $300M venture, and its detector highly complex. Data from proton-antiproton collisions is recorded by it 24/7, which requires fast and thorough quality-assessment before it can be used for any physics analysis.

I was the co-leader of Data Quality group at D0 for three years, and shared the responsibility for ensuring that data from the detector are suitable for analysis. I led and coordinated the efforts of a group of sub-detector experts (~20) to assure that individual detector components were working properly. At the beginning of my term, I re-vamped the entire procedure for monitoring data so it was done more efficiently and in a timely manner. Besides developing scripts to stream-line the different steps involved into an easy-to-use tool, I coordinated the monitoring by a pool of physicists (~50) who were mostly remote collaborators. This required extensive and clear documentation as well as an effective channel of feedback and response. Below is a link to the web-page I

developed for this purpose and also to facilitate communication between the data-quality providers (us), and its consumers (entire collaboration):
http://www-d0.fnal.gov/computing/data_quality/

Mentoring Students

Working on a variety of physics analyses has given me an opportunity to work closely and mentor several students from different universities at D0. A few of them are noted below:

- **Daekwang Kau**, Florida State University, PhD 2007;
  Thesis title: *Evidence for Single Top Quark Production Using Bayesian Neural Networks*
- **Sohrab Hossain**, University of Oklahoma;
  Thesis title: *Measurement of the t-tbar cross section in the tau+jets channel*
- **Diego Menezes**, Northern Illinois University;
  Research title: *Search for charged Higgs bosons in decays of top quarks*
- **Andres Tanasijczuk**, Universidad de Buenos Aires, Argentina;
  Thesis title: *First Observation of single top production cross section using Bayesian Neural Networks*.

I also supervised a summer-intern, **Josiah Walton**, under the Science Undergraduate Laboratory Internships (SULI) Program. This program places students in paid internships in Science and Engineering at any of the several Department of Energy facilities. With Josiah, I explored state-of-the-art techniques in Neural Networks to enhance the sensitivity of the single-top search. It was extremely rewarding to work with Josiah, who later won the National Science Foundation's Graduate Research Fellowship Award, and plans to pursue a career in particle physics.

Professional Service (2000 – present)

Throughout my time at Fermilab, I have contributed to many aspects of collaboration-wide tasks both at D0 and CMS, aimed at improving the overall functioning and performance of the respective detectors and the physics with them. These include the following:

CMS experiment (CERN, Switzerland):

- **Jet Energy Corrections:** The energy of a jet measured in the calorimeter requires to be corrected in order to be matched to that of the particle-level jet originating from a final-state parton in proton-proton collisions. These corrections are due to different factors, for example, the noise from the detector electronics, the underlying events and pile-up, or the showering of particles outside of the jet-measurement cone. CMS has a multi-level jet correction system and I am presently working on the first level of corrections due to the electronics noise and pile-up. We call this the “offset” jet energy corrections which require to be subtracted from the measured jet energies.

- **Statistical Analysis Procedures:** I have extended my work started at D0 on Bayesian-prior estimation ("Reference Priors") to CMS. A methodic definition of priors would be of prime importance in specially searches for signals of small sizes --- as would be typical in a plethora of Physics Beyond the Standard Model searches as well as the search for the Higgs boson. I have also developed a general-use software package that implements the methods studied, and released it to the Physics Statistics Code Repository (phystat.org). This work is the beginning of developing formal procedures in the application of Bayesian statistics to physics analyses at CMS, and to high energy physics problems, in general.
  Currently, I am working on including the Reference Priors framework in "ROOSTATS" which is a collaborative project between the ATLAS and CMS experiments at CERN, Switzerland, and the ROOT team, to provide a complete statistical suite in ROOT. (ROOT is an object-oriented framework for large-scale data analysis).

D0 experiment (Fermilab, USA):

- **Testing Code for Speed-up of Reconstruction Software:** As the Fermilab accelerator improved its performance over time resulting in more data getting recorded in a given interval of time, it became imperative to upgrade the D0 reconstruction-software to keep up with the pace of data arriving. I worked with a team of computer and physics experts to test the speed-up of this software whereby the non-linear increase in the data-reconstruction time as a function of the data-recording time was reduced to a linear response with a slope less than unity.
- **Tuning of Monte Carlo Simulations:** In most physics analyses, MC simulations are used to model the signal and backgrounds predicted by theories in order to compare them with the real data collected by the detector. These simulations often do not model the noise in the detector well and need to be tuned in order to better match the data. I have worked on different aspects of tuning and performed studies to ensure that the application of these techniques provide an accurate description of the data.
- **Software Development and Optimization:** For each of the physics analyses discussed above and the MC tuning, I developed extensive code (C++, object oriented) and scripts (shell, python). I contributed to software upgrades too at D0 on various fronts, most notably in jump-starting the software transition for the top-quark physics program to adapt to a Common Analysis Framework (CAF) that was designed for physics analyses across the collaboration. One of my principal goals was to improve the framework in terms of modularity, speed, robustness and documentation. I also co-authored several packages at D0, two most noteworthy of which are for the application of Bayesian Neural Networks for discriminating signals from backgrounds, and for the statistical analysis of data. Although these were developed originally in the context of the single-top program, the code is generic, and applicable to a wide range of physics analyses.

Monte Carlo Simulations for Neutron Therapy Facility at Fermilab (2009)

I am very much interested in the application of the technology from high energy physics to other areas, and in particular to Medical Physics. Being stationed at Fermilab gave me an excellent opportunity to explore this with the Neutron Therapy Facility here. This is one of only two sites in the United States offering neutron therapy to cancer patients. I worked on setting up the GEANT4 software in their analysis framework. Preliminary studies were to bench-mark the setup by comparing the GEANT4 performance with another MC simulator (MCNPX), but the long-term goal is to set up an MC-based treatment planning procedure.

Projects (1992-1997)

During my MS and BS, I have worked on the following projects:

- As a summer intern at the Tata Institute of Fundamental Research, Mumbai, 1996:
  The Study of Efficiency and Uniformity of a Large Scintillator with WLS (WaveLength Shifting) Fiber Readout.

- During BS, University of Delhi, 1995:
  To Design an Analog Circuit to Simulate the Solutions of 1st and 2nd Order Differential Equations using Operational Amplifiers.

Selected Publications

I am a co-author of over 200 experimental high-energy physics publications. Listed below are the publications where I played a key role in the analysis, review, and authorship of paper. The additional publications are linked here: http://home.fnal.gov/~sjain/mypage/sjain_publications.pdf

1. **Phys. Rev. D 82: 071102, 2010,** *Measurement of t-tbar Production in Tau+Jets Topology Using p-pbar Collisions at* $\sqrt{s}$ *= 1.96 TeV,* for the D0 Collaboration (V.M. Abazov et. al.).

2. **Phys. Rev. Lett. 103: 092001, 2009,** *Observation of Single Top Quark Production*, for the D0 Collaboration (V.M. Abazov *et. al.*), **Cited 98 times**
   - **PRL Editors' Suggestion**
   - **"Physics" Synopsis Article**
3. **Phys. Rev. D 80: 051107, 2009**, *Search for Charged Higgs Bosons in Decays of Top Quarks*, for the D0 Collaboration (V.M. Abazov *et. al.*), **Cited 8 times.**

4. **Phys. Rev. D 82: 034002, 2010**, *Reference Priors for High Energy Physics*, Luc M. Demortier, Supriya Jain, Harrison B. Prosper.

5. **Phys. Rev. Lett. 102: 161801, 2009,** *Evidence of WW and WZ production with lepton + jets final states in p-pbar Collisions at* $\sqrt{s}$ *= 1.96 TeV,* for the D0 Collaboration (V.M. Abazov et. al.), **Cited 20 times**.

6. **FERMILAB-FN-0821-E**, *Searches for Flavor-Changing Neutral Currents and Single Top Quarks at D0*, an essay for the application of Fermilab-Tollestrup award competition for outstanding researcher.

7. **Phys. Rev. D 78: 012005, 2008**, *Evidence for Production of Single Top Quarks*, for the D0 Collaboration (V.M. Abazov *et. al.*), **Cited 79 times**.

8. **Phys. Rev. Lett. 99: 191802, 2007**, *Search for Production of Single Top Quarks via tcg and tug Flavor-Changing-Neutral-Current Couplings*, for the D0 Collaboration (V.M. Abazov *et. al.*), **Cited 28 times**.

9. **Fermilab-CONF-07/052, 2007,** *Tevatron-for-LHC Report: Top and Electroweak Physics*, C.E. Gerber, et al, **Cited 37 times**.

10. **Phys. Rev. Lett. 98: 181802, 2007,** *Evidence for Production of Single Top Quarks and First Direct Measurement of* $|Vtb|$, for the D0 Collaboration (V.M. Abazov *et. al.*), **Cited 156 times**.

11. **Phys. Rev. D 75: 092007, 2007**, *Multivariate Searches for Single Top Quark Production with the D0 Detector*, for the D0 Collaboration (V.M. Abazov *et. al.*), **Cited 30 times**.

12. **Phys. Lett. B 622:265-276, 2005**, *Search for Single Top Quark Production in p-pbar Collisions at √s = 1.96 TeV*, for the D0 Collaboration (V.M. Abazov *et. al*.), **Cited 58 times**.

13. **Phys. Rev. Lett. 92:221801, 2004**, *Search for Narrow t-tbar Resonances in p-pbar Collisions at √s = 1.8 TeV*, for the D0 Collaboration (V.M. Abazov *et. al*.), **Cited 26 times**.

14. **Phys. Rev. D62:095003,2000**, *Search for Quark-Lepton Compositeness at Tevatron and the Large Hadron Collider (LHC)*, Supriya Jain, Naba K.Mondal, Ambreesh K.Gupta, **Cited 3 times**.

15. **CMS Note (note99 075)**, for the CMS Collaboration at CERN, Geneva, *Search for Quark-Lepton Compositeness Using Dielectron Data at the Large Hadron Collider*, Supriya Jain, Naba K.Mondal and Ambreesh K.Gupta.

Analysis Notes

Listed below are the CMS and D0 documents on studies and analyses in which I played a key role and co-authored:

CMS experiment (CERN):

- **CMS-AN-10-150**, *Offset Energy Correction for Cone Jets,* S. Jain and Ia Iashvili.

D0 experiment (Fermilab):

- **D0 Note 5816**, *Measurement of |Vtb| using the Single Top Quark Observation Analyses from 2.3 fb^{-1} of Data*, Single Top Working Group (E. Aguilo, *et. al*.).

- **D0 Note 5815**, *Combination of Three Single Top Quark Cross Section Measurements from 2.3 fb^{-1} of Data using the BLUE Method*, Single Top Working Group (E. Aguilo, *et. al*.).

- **D0 Note 5814**, *Combination of Three Single Top Quark Cross Section Measurements from 2.3 fb^{-1} of Data using a Bayesian Neural Network*, Single Top Working Group (E. Aguilo, *et. al*.).

- **D0 Note 5813**, *Study of Single Top Quark Production in 2.3 fb^{-1} of Data using Matrix Elements*, Single Top Working Group (E. Aguilo, *et. al*.).

- **D0 Note 5812**, *Observation of Single Top Quark Production in 2.3 fb^{-1} of Data using Bayesian Neural Networks*, Single Top Working Group (E. Aguilo, *et. al*.).

- **D0 Note 5811**, *Observation of Single Top Quark Production in 2.3 fb^{-1} of Data Using Boosted Decision Trees*, Single Top Working Group (E. Aguilo, *et. al*.).

- **D0 Note 5810**, *Single Top Quark Production in 2.3 fb^{-1} of data — Signal and Background Modeling and Event Selection*, Single Top Working Group (E. Aguilo, *et. al*.).

- **D0 Note 5793**, *Single top Combination (Multivariate approach to combining the p17 DT, BNN and ME analyses)*, E. Aguilo, *et. al*., (work done by Fermilab SULI Summer Intern, Josiah Walton, under my guidance).

- **D0 Note 5583,** *A search for charged Higgs bosons in the decay of top quark pairs*, S. Jain, D. Menezes, D. Chakraborty, M. Arov, P. Gutierrez.

- **D0 Note 5500**, *Jet Faking Tau Studies*, S. Jain, S. Protopopescu.

- **D0 Note 5490**, *Limit setting and cross section measurements using a Bayesian approach*, S. Jain, H.B. Prosper.

- **D0 Note 5413**, *Effect of Changing Top Quark Width on the Selection of tau+jets Events*, S. Jain, P. Gutierrez, D. Chakraborty, S. Hossain, M. Arov.

- **D0 Note 5440**, *First direct measurement of |Vtb|*, E. Aguilo, *et. al*.

- **D0 Note 5390**, *Improved Search for Single Top Quark Production Using The Matrix Element Analysis Technique in 1 fb^{-1} of Data*, E. Aguilo, *et. al*.

- **D0 Note 5361**, *A Second Look at Bayesian Neural Networks in the Search for Single Top Quarks in 1 fb^{-1} of Data*, E. Aguilo, *et al*.

- **D0 Note 5342**, *Combining results from single top cross section measurements using the BLUE method*, E. Aguilo, *et al*.

- **D0 Note 5338**, *Combining results from single top cross section measurements*, S. Jain and H. B. Prosper.

- **D0 Note 5288**, *Using Bayesian neural networks to search for single top quarks in 1 fb^{-1} of data*, S. Jain, *et. al*.

- **D0 Note 5285**, *Search for single top quark production in 1 fb^{-1} of data*, E. Aguilo, *et. al*.

- **D0 Note 5260**, *Analysis Optimizations using Bayes factors*, S. Jain and H. B.

Prosper.

- **D0 Note 5259**, *Some thoughts on S/√B as a measure of significance*, S. Jain and H. B. Prosper.

- **D0 Note 5258**, *Defining p-value with systematic effects, and using spectral distributions*, S. Jain and H. B. Prosper.

- **D0 Note 5123**, *Computing limits using a Bayesian approach in the package: top statistics*, S. Jain, *et. al*.

- **D0 Note 5117**, *Search for single top quarks via flavor-changing neutral-current interactions at D0 in Run II* , S. Jain, L. Dudko,, E. Boos, V. Bunichev, M. Perfilov.

- **D0 Note 4853**, *Re-thinking the likelihood and prior in single top analyses*, H. B. Prosper, *et. al*.

- **D0 Note 4670**, *Improved search for single top quark production at D0 in Run II*, M. Agelou, *et. al*.

- **D0 Note 4512**, *Top trigger efficiency measurements and the top trigger package*, M. Agelou, *et. al*.

- **D0 Note 4402**, *Scale and Over-smearing parameters for high-p_T Monte Carlo electrons*, S. Jain.

- **D0 Note 4398**, *Search for Single Top Quark Production at D0 in Run II*, S. Jain, *et. al*.

- **D0 Note 3943**, *Search for t-tbar resonance using D0 Run I data at Tevatron*, Fermilab, S. Jain, N. K.Mondal and D. Chakraborty.

- **D0 Note 3752**, *Search for Quark-Lepton Compositeness for Run II and TEV33 with the D0 Detector at Tevatron*, Fermilab, S. Jain and N. K. Mondal.

Talks and Presentations

(1) 13 May, 2010 **Physics Seminar** (by invitation), University of Delaware:
Discovery of Single Top Quarks.

(2) 11 Mar., 2008 **Rencontres de Moriond QCD, 2008** held at La Thuile, Italy:
Evidence for Single Top Production at the Tevatron.

(3) 01 Nov., 2006 **DPF + JPS 2006 (Joint Meeting of Pacific Region Particle Physics Communities), 2006** held at Honolulu, Hawaii:
Search for Single Top Quarks via Flavor - changing neutral currents.

(4) 23 Apr., 2006 **APS (American Physical Society) Meeting, 2006** held at Dallas, Texas:
Search for Single Top Quarks through FCNC interactions at D0.

(5) 18 April., 2005 **APS (American Physical Society) Meeting, 2005** held at Tampa, Florida:
Upper Limits on Cross Sections using Kinematic Distributions, and the Single Top Quark Search at D0.

(6) 30 Aug., 2004 **DPF (Division of Particles and Fields) Meeting, 2004** held at Riverside, California:
Search for Production of Single Top Quarks in the Electron + Jets Channel at D0.

(7) 04 May, 2004 **APS (American Physical Society) Meeting, 2004** held at Denver, Colorado:
Search for t-tbar Resonances in p-pbar Collisions at $\sqrt{s}$ 1.8 T eV.

(8) 04 Jan., 2003 **IXth International Symposium on Particles, Strings and Cosmology**, held at Tata Institute of Fundamental Physics (TIFR), Mumbai, India:
Search for t-tbar Resonances Using D0 Run I Data at Tevatron.

(9) 13 Sep. 2002 **5th International Conference on Quark Confinement and Hadron Spectrum**, held at Gargnano, Italy:
Search for t-tbar Resonances Using D0 Run I Data at Tevatron.

(10) 11 Dec. 2000 **Workshop on Physics with CMS at LHC**, held at TIFR, India:
Search for Quark - Lepton Compositeness at the LHC at CERN, Geneva.

(11) 28 Jun. 2000 **New Perspectives Graduate Student Conference**, held at Fermilab, USA:

Poster *Modelling the D0 Calorimeter in a fast parameterized Monte Carlo Simulator*.

Talk *Particle Identification using Neural Networks*.

(12) 03 Jan. 2000 **VI Workshop in High Energy Physics Phenomenology**, held at the Institute of Mathematical Sciences, Chennai, India:
Search for Compositeness of quarks and electrons at Tevatron, Fermilab, USA, and at LHC at CERN, Geneva.

Proceedings of Conferences

1. **2008 QCD and High Energy Interactions**, *Evidence for Single Top Production at the Tevatron*, for the CDF and D0 Collaborations (S. Jain), XLIIIrd Rencontres de Moriond, 2008 (arXiv:0805.3878).

2. **Int.J.Mod.Phys.A20:3187-3189,2005**, *Search for production of single top quarks in the electron + jets channel at D0*, for the D0 Collaboration (S. Jain), Division of Particles and Fields (DPF) of the American Physical Society (APS), 2004.

3. **Pramana, Vol.62, No. 3, 561, 2004**, *Search for Narrow-Width t-tbar Resonances in p-pbar Collisions at* $\sqrt{s}$ *= 1.8 TeV*, for the D0 Collaborations (S. Jain), International Symposium on Particles, Strings, and Cosmology (PASCOS), 2003.

4. **Quark Confinement and the Hadron Spectrum V, 419, 2002**, *Search for t-tbar Resonances Using D0 Run I Data at Tevatron*, for the D0 Collaborations (S. Jain), International Conference on Quark Confinement and Hadron Spectrum, 2002.

References for Letters

Professor Harrison B. Prosper
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